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\* Touchless Door Unlock System

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\* Overview:

\* This system enables a touch-free door unlocking mechanism using an IR sensor.

\* - An IR sensor (D5) detects the presence of a person.

\* - When presence is detected, the LED turns OFF, the buzzer beeps three times, and the servo moves to 90° to unlock the door.

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\* Logic:

\* - The system continuously monitors for motion using the IR sensor.

\* - When a person is detected, the buzzer beeps three times, and the door unlocks.

\* - The LED status provides a visual indication of detection.

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\* Components:

\* - Hedy MCU (ESP8266)

\* - IR Sensor (D5) (Active Low)

\* - Servo Motor (D8)

\* - Buzzer (Active Low)

\* - LED Indicator (Active Low)

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#include <Servo.h>

#define IR\_SENSOR\_PIN D5 // IR sensor for presence detection (Active Low)

#define SERVO\_PIN D8 // Servo motor for door unlocking

#define BUZZER\_PIN D3 // Buzzer (Active Low)

#define LED\_PIN D4 // LED Indicator (Active Low)

#define BEEP\_COUNT 3 // Number of beeps when detection occurs

#define BEEP\_DELAY 200 // Delay between beeps in milliseconds

Servo doorServo;

void setup()

{

Serial.begin(115200); // Initialize serial communication

pinMode(IR\_SENSOR\_PIN, INPUT\_PULLUP); // Configure IR sensor pin as input with internal pull-up

pinMode(BUZZER\_PIN, OUTPUT); // Configure buzzer pin as output

pinMode(LED\_PIN, OUTPUT); // Configure LED pin as output

doorServo.attach(SERVO\_PIN, 500, 2400); // Attach servo with pulse width range for full motion control

doorServo.write(0); // Set initial servo position (Locked state)

digitalWrite(BUZZER\_PIN, HIGH); // Ensure buzzer is OFF at startup

digitalWrite(LED\_PIN, HIGH); // Ensure LED is ON at startup (Active Low)

Serial.println("System Initialized: Waiting for detection...");

}

void loop()

{

if (digitalRead(IR\_SENSOR\_PIN) == LOW) // Person detected (Active Low)

{

Serial.println("Person Detected: Unlocking door...");

unlockDoor();

}

else

{

digitalWrite(LED\_PIN, HIGH); // Keep LED ON (Active Low)

doorServo.write(0); // Ensure door is locked

Serial.println("Door Locked!!");

}

}

void unlockDoor()

{

digitalWrite(LED\_PIN, LOW); // Turn OFF LED (Active Low)

beepAlert(); // Beep three times as an alert

doorServo.write(90); // Unlock door (Move servo to 90°)

Serial.println("Door Unlocked!!");

delay(1000); // Hold position

}

void beepAlert()

{

for (int i = 0; i < BEEP\_COUNT; i++)

{

digitalWrite(BUZZER\_PIN, LOW); // Turn ON buzzer (Active Low)

delay(BEEP\_DELAY);

digitalWrite(BUZZER\_PIN, HIGH); // Turn OFF buzzer

delay(BEEP\_DELAY);

}

}